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SOVIET MEETING DISCUSSES PROBLEMS OF ONCOLOGY

[Comment: This article by A. V. Chaklin was published in the Moscow-Leningrad periodical, Voprosy Onkologii, Vol I, No 5, Sep/Oct 1955, pp 121-126, under the Title "A Coordination Meeting on Oncology of Institutes of the Academy of Medical Sciences USSR Held Jointly With Institutes of the Academy of Sciences USSR and Those of the Academies of Sciences of Union Republics."]

From 9 to 11 June 1955, a coordination meeting of institutes of the Academy of Medical Sciences USSR was held jointly with institutes of the Academy of Sciences USSR and of academies of sciences of union republics. This meeting dealt with problems of oncology and had the purpose of expanding and coordinating work on cancer as well as engaging specialists from various fields of science in work on the problem of malignant tumors. More than 100 specialists, who came from the scientific research institutes of Moscow, Leningrad, Kiev, Riga, Tbilisi, Tallin, Vil'nyus, Alma-Ata, Minsk, and other cities, participated in the work of the conference.

In the address which opened the conference, Prof N. N. Blokhin, Corresponding Member of the Academy of Medical Sciences USSR, emphasized that in the work on problems of oncology, to which a state-wide importance must be attached, a sufficient degree of comprehensiveness is missing, so that one of the tasks of the conference from the organizational standpoint must be improvement of the planning of scientific research.

While at present attempts are being made to coordinate the work done at scientific research institutes of the Academy of Medical Sciences USSR with that conducted at the academies of sciences of union republics, it will be necessary, after this has been accomplished, to achieve coordination with work done at institutions subordinate to the Ministry of Higher Educational Institutions of the USSR.

A report was made by the Chairman of the Scientific Council on the Problem of Cancer Attached to the Presidium of the Academy of Medical Sciences USSR, Prof A. I. Serebrov, Corresponding Member of the Academy of Medical Sciences USSR. The report, entitled "A Brief Characterization of the Present State of Investigations on the Basic Problems of Oncology and Future Tasks of Research in This Field," pointed out that national science has achieved a certain measure of success in establishing the causes of tumors and developing effective methods for the prophylaxis and therapy of malignant tumors. However, up to the present time there has been no comprehensive coordination of investigations in this field, so that this important shortcoming must be corrected. The problem of cancer is not only a medical problem, it is also a biological one and for that reason must be studied at institutions of various types with the participation of representatives of the most diverse branches of science (biologists specializing in various fields, biochemists, chemists, physicists, ethnographers, etc.)

At the present level of knowledge the principal investigations in oncology are being carried out in the following four main subdivisions:

1. Research on the causes of tumors
2. Search for reliable methods of early diagnosis of malignant tumors
3. Development of effective methods of therapy of malignant tumors
4. Search for methods to be applied in the prophylaxis of malignant tumors

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At present, still another line of research has been launched which is capable of yielding important data pertinent to the further investigation of problems of the etiology and pathogenesis of malignant tumors.

Research on the etiology of malignant tumors is being carried out from different standpoints. The majority of USSR investigators, who are headed by N. N. Petrov, adhere to the theory that there are multiple causes of malignant tumors. They maintain that different harmful influences, which may be chemical, hormonal, physical (radiation), or of a virus nature can under certain conditions bring about disturbances of metabolism and thus induce the formation of a tumor.

A considerable array of data has been collected during recent years by protagonists of the virus theory of tumors, i.e., L. A. Zil'ber, A. D. Timofeyevskiy, and others.

The chemical concept of the origin of cancer (i.e., the theory which is concerned with the effects of cancerogenic substances) has been elaborated for many years. The principal proponent of this theory is L. M. Shabad.

Notwithstanding the existence of different viewpoints in regard to the origin of malignant tumors, the work of Soviet scientists is unified by a common methodological postulate, i.e., a recognition of the unity and integral nature of the organism as well as of its indissoluble dependence on the environment.

In their studies of the malignification of normal cells, Soviet scientists could not be satisfied with the theory of somatic mutation which is widespread among foreign oncologists.

Investigation of the modifiability of tumor cells under the influence of changing environmental conditions (A. D. Timofeyevskiy) has demonstrated the possibility of a return to normal of the morphology of tumor cells in tissue cultures under different conditions. This discovery opens up new prospects for subsequent research.

Prerequisites for organizing extensive research on cancer exist in the USSR. However, at present the institutions which do research on the problem of cancer lack an adequate amount of trained personnel. Furthermore, the number of institutions which work on problems of theoretical oncology at the institutes of the Academy of Medical Sciences USSR. For that purpose the institutes and their laboratories must be provided with the most modern equipment. Furthermore, the training of personnel should be expanded. All this requires considerable capital and production investments. However, these investments are absolutely necessary if this problem, which is one of the principal problems of contemporary medicine, is to be solved.

The author of this report [Serebrov] discussed in detail research on the role of viruses in the etiology of malignant tumors and also the significance of endogenic blastomogenic substances, disturbances of hormone metabolism, etc. Great attention should be paid to the investigation of chemical cancerogenic substances in order that the prophylaxis of various types of tumors may be properly organized. To solve the last-mentioned problem, the close cooperation of experimental oncologists, hygienists, chemists, and technical workers active in the individual specialized fields is necessary. At the present level of scientific development in this general field, a particular role will be played by investigative work on the blastomogenic effect produced by various types of radiation.

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The contemporary state of science with regard to the application of atomic energy sets a number of new tasks, both as far as investigation of the effects of ionizing radiation on the organism and the results of exposure to this radiation (for instance, development of malignant tumors as a result of exposure to radiation) are concerned, and as far as atomic energy may be applied for therapeutic purposes.

In addition to the lines of investigation mentioned above, the following problems of theoretical and practical oncology should be studied: the influence of the nervous system on the origin of tumors and their development; the changes which organs and tissues undergo prior to development of a tumor; the effects of heredity on the occurrence and development of cancer; the effect of nutrition on cancer; the biochemistry of cancer; and the creation of experimental models of tumor growth. Of decisive importance is the utilization of results of experimental investigations in practical work on the prophylaxis of human cancer. Work in this subdivision of science includes the detection of chemical cancerogenic substances in the environment, prevention of harmful effects exerted by these substances, the detection of pretumor changes, and ways of establishing whether or not therapy aimed at the elimination of these changes has been effective. On the basis of the results of experimental research, one may take measures for the protection against cancer and its prophylaxis.

An exceptionally important field is the experimental chemotherapy of tumors. The development and introduction into practical use of such drugs as embichin, novembichin, and omain, as well as the investigation of new drugs such as limfokhin [lymphoquine], sarkolizin [sarcolysine], dopan, and of a number of hormones and antibiotics opens up new possibilities. [Dopan is 4-methyl - 5- di (2-chloroethyl) amino-uracil. It has been synthesized by V. G. Nemets and E. Z. Ayrapetyants and tested for its anti-tumor activity by L. F. Larionov and S. N. Platonov, according to a paper published in Voprosy Onkologii, Vol 1, No 5, Sep-Oct 1955, p 36.

One must admit that the USSR is still behind a number of foreign countries as far as research on the chemotherapy of tumors is concerned. Measures must be taken to eliminate this lag.

Particular attention was paid in [Serebrov's] report to problems pertaining to the scientific investigation of statistical data in regard to malignant tumors in connection with the necessity of further expanding this field of science. An analysis of data on the incidence of cancer in the USSR and other results obtained by oncological institutions show that investigation of the incidence of cancer and lethality resulting from cancer yields results on the basis of which conclusions can be drawn which will contribute to the effectiveness of anticancer measures.

The author of the report stated that subsequent measures against cancer must be taken along the following lines:

1. Investigation of problems pertaining to the etiology of malignant human tumors
2. Investigative work on the prophylaxis of malignant tumors
3. Expansion of measures aiming at the early diagnosis and effective therapy of conditions which precede cancer and of early forms of cancer
4. Unflagging work on the training of personnel and improvement of qualifications of the personnel
5. Expansion of education work and propaganda among the population and improvement of the quality of this work

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All this will make it possible to approach the solution of the basic problems of practical oncology, provided that the scientific research institutions of the country will be supplied with the most modern equipment.

In conclusion, the author of the report emphasized that the problem of malignant tumors can be successfully solved: its solution is merely a question of time and of proceeding along the right way. If the foremost scientific institutions of the country with their highly qualified personnel will be engaged in work in this field and sufficient means are put at their disposal, the most important step towards the solution of the problems which have arisen will be made.

Prof A. E. Timofeyevskiy (Kiev), Active Member of the Academy of Medical Sciences USSR, pointed out that in the Ukrainian SSR investigations on oncological problems are not yet being carried out on a sufficient scale. Nevertheless, at the Institute of Physiology imeni A. A. Bogomolets, Academy of Sciences Ukrainian SSR, a number of investigations is being conducted on the pathogenesis of cancer and the role which disturbances of the functioning of the nervous system play in this pathogenesis (R. Ye Kavetskiy), while at the Kiev Sanitary-Bacteriological Institute work is being done on viruses and explantates of human tumors as well as on the cultivation of viruses in explantates of normal animal tissues and on chicken embryos (A. D. Timofeyevskiy).

It is necessary to create an independent laboratory of tissue culture at one of the oncological institutes.

Prof P. S. Chanturishvili (Tbilisi) stated that in the Georgian SSR research on oncology has been begun at the Institute of Clinical Surgery and Hematology and at the Institute of Zoology. Of particular importance is the study of antibiotics and of the effects produced by them in the experimental therapy of malignant tumors. Theoretical oncologists must give scientific assignments to the representatives of various specialists, including embryologists who may be able to investigate under new experimental conditions the effects of substances inhibiting growth.

In amplifying the report by Chanturishvili, T. G. Natadze (Tbilisi) Candidate of Medical Sciences, pointed out that the investigation of some biologically active substances which inhibit the growth of tumors (bomapi and others) opens up new possibilities. In the Georgian USSR, all prerequisites exist for expanding experimental laboratory work in the field of oncology. Work which is at present being carried out without any official plan should be regularly planned. It is necessary to coordinate investigations being carried out by the Academies of Sciences of Union Republics and the Academy of Medical Sciences USSR, respectively.

Prof T. I. Stradyn' (Riga), Active Member of the Academy of Sciences Latvian SSR, stated that a whole series of investigations on problems of oncology is being carried out at the Sector of Oncology, Institute of Experimental Medicine, Academy of Sciences Latvian SSR. The problems which have been studied include the nutrition of patients suffering from malignant tumors and problems connected with the early diagnosis of cancer of the stomach and cancer of the breast. A laboratory of tissue cultures exists at the institute. A number of workers at the republic's oncological dispensary are participating in this work. At present there are indications that regional peculiarities exist as far as the occurrence of malignant tumors in the Latvian SSR is concerned. This matter will be subjected to investigation.

Prof V. V. Girdziyauskas (Vil'nus) stated that an oncological sector exists at the Institute of Experimental Medicine, Academy of Sciences Lithuanian SSR. However, the scope of investigations carried out there has been

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very limited hitherto. The problems which have been investigated comprise the effects of higher nervous activity on the growth of tumors, the effects of neobenzinol, the cancerolytic effects of kephalin, etc. Within the scope of the work done in the republic, one should investigate the regional characteristics of the occurrence of malignant tumors. For this purpose the institute should be reinforced with personnel and supplied with additional equipment.

Prof P. A. Bogovskiy (Tallin) stated that the investigations conducted at the Institute of Experimental and Clinical Medicine, Academy of Sciences Estonian SSR, are aimed at obtaining data in regard to the effects of Estonian shales on the organism. The republic's oncological dispensary and the Chair of Dermatovenereology of the Medical Institute at Tartu participate in this work. The principal task is to determine the cancerogenic activity of the shales. Contacts which exist between the Estonian Institute and the Institute of Oncology, Academy of Medical Sciences USSR, are of genuine help in the solution of practical problems pertaining to the prophylaxis of malignant tumors. The reports given by the representatives of the academies of sciences of the union republics and the principal report which has been presented indicate that the problem of cancer is not being investigated at all at institutions of the Academy of Sciences USSR, while at the academies of sciences of the union republics, work in this field is being conducted substantially without any plan or systematic direction on the part of the Academy of Medical Sciences USSR.

All persons presenting reports noted that the principal shortcoming in scientific research work in oncology is the small number of institutions which work on cancer. The general level of investigations that are being carried out does not correspond to the effort which must be made if the contemporary problems of oncology are to be solved. This indicates that increased financing of research in this field is necessary and that large capital investments and production expenditures must be made. Furthermore, the following drawbacks were mentioned: absence of the necessary quantity of modern equipment; lack of personnel doing scientific work and of auxiliary personnel; absence of modern establishments for the breeding and keeping of animals; a lack of special strains of animals and of tumor strains for experimental work; and a shortage of chemical substances needed for this work (hormones, cancerogenic substances, and new chemotherapeutic drugs).

Among the general circumstances which interfere with scientific work on problems of oncology is the absence in the USSR of scientific statistics on the incidence of malignant tumors and on lethality from malignant tumors compiled on the basis of clear indexes.

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Criticism will undoubtedly improve the organization of scientific research on cancer and thus make it possible to carry out work in this field on a more adequate scale. The attention of the Presidium of the Academy of Sciences USSR and the Presidium of the Academy of Medical Sciences USSR was called to this circumstance in a resolution passed by the conference.

Prof I. D. Davydovskiy, Active Member of the Academy of Medical Sciences USSR, emphasized at the meeting that one must begin to study more thoroughly the morphology, biochemistry, and biology of the tumor process. Tumor growth is a form of evolution and a process not clearly understood, so that greater attention must be paid to the investigation of the cancer cell, of problems of the heredity of malignant tumors, and problems of comparative oncology. An urgent need has arisen for reviewing the accepted classification of malignant tumors.

Prof A. A. Solov'yev (Moscow), Corresponding Member of the Academy of Medical Sciences USSR, characterized the role of the nervous system in the pathogenesis of malignant tumors and proposed that an increased number of investigations be carried out along this line not only on mice but also on dogs and simians and that furthermore an analysis of the innervation of tumors be conducted and physiological laboratories be created at institutes of oncology. Particular attention should be devoted to the investigation of the histochemistry of tumors.

Prof Ye. M. Vermel' (Moscow) suggested to the conference that scientific documentation in regard to work carried out abroad be increased by expanding the scope of the periodical Sovremennyye Problemy Onkologii and that, furthermore, critical reviews dealing with the most important problems of theoretical and clinical oncology be published in the journal Voprosy Onkologii. Expansion of work in experimental chemotherapy requires on the one hand the preparation of a number of chemical substances, so that they will be available in sufficient quantity, and on the other hand acquisition of strains of tumors needed for experimental work in this field.

Prof V. G. Nemets (Leningrad) emphasized the particular importance of coordination between the work of chemotherapeutists and that of chemists who synthesize the substances needed.

The testing of chemical substances must be carried out under different clinical and experimental conditions, so that the results may be evaluated correctly.

Prof V. V. Alpatov (Moscow) advocated that common efforts be made by mathematicians, chemists, physicists, and biologists in solving the complex problem of tumor growth. Prof M. S. Gol'dberg (Moscow) suggested cooperation between oncologists and hygienists in the investigation of cancerogenic factors and the organization of the prophylaxis of malignant tumors.

N. M. Blokhin, Corresponding Member of the Academy of Medical Sciences USSR and Ye. Ye. Pogonyants (Moscow), Doctor of Biological Sciences, stated that the role of the Scientific Council on the Problem of Cancer at the Presidium of Medical Sciences USSR be expanded as far as the coordination of work in different fields is concerned. A clear assignment of subject matter on individual problems and engagement of the institutions of the Ministry of Higher Educational Institutions in participation in work of this type may yield good results.

In statements made by Prof L. A. Zil'ber, Active Member of the Academy of Medical Sciences USSR, and Prof L. M. Shabad, Corresponding Member of the Academy of Medical Sciences USSR, as well as by other participants at the meeting, it was pointed out that the investigation of problems in the field of experimental oncology requires the use not only of ordinary experimental animals, but

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also of special strains of laboratory animals and of strains of tumors which can be transplanted. Furthermore, the research work requires lengthy preparation in order that experimental models of tumors of different localization may be obtained. In addition to that, the results of the observations that have been made must be correlated with clinical and statistical data, the collection of which requires a considerable time. This is the reason why research on the etiology of tumors requires special conditions for the experimental work and an unusual length of time for its completion.

The role of viruses in the genesis of tumors is being investigated at the Institute of Epidemiology and Microbiology imeni Gamaleya (Division of Virology, Prof L. A. Zil'ber), at the State Oncological Institute (GOI) imeni Gersten (L. A. Zil'ber's Laboratory), at the Institute of Experimental Pathology and Therapy of Cancer (IEPiTR, Division of Etiology, A. D. Timofeyevskiy), at the Institute of Oncology of the Academy of Medical Sciences USSR (M. F. Glazunov, N. G. Khlopin, and L. M. Shabad), at the Institute imeni Bogomolets at Kiev (the Laboratory of Experimental Cytology headed by A. D. Timofeyevskiy), and at the laboratory of the Sukhumi Medicobiological Station.

It is desirable that R. A. Kavetskiy's laboratory at the Institute imeni Bogomolets at Kiev and the Voronezh Oncological Institute (Kolesnikov) be induced to participate in work on this subject as soon as possible. The coordination of work in this field has been entrusted to the Division of Virology, Institute of Epidemiology and Microbiology imeni Gamaleya (Prof L. A. Zil'ber).

The problem of heterotransplantation of tumors and the isolation of strains of transplantable human tumors is being investigated at the Institute of Experimental Pathology and Therapy of Cancer (Laboratory of Tumor Strains, Ye. Ye. Pogoyants), at the State Oncological Institute imeni Gertsen (Laboratory of Virology), the Institute of Oncology of the Academy of Medical Sciences USSR (Laboratory of Experimental Oncology), the Institute of Microbiology of the Ministry of Health Ukrainian SSR (Laboratory of Tumor Etiology), the Institute of Neurosurgery imeni Burdenko, and the Kiev Roentgeno-Oncological Institute (S. P. Sizenko).

It has been decided to engage in work on the study of this problem, first of all, the Institute of Experimental Surgery at Tbilisi (K. D. Eristavi and G. E. Georgadze), the Institute of Zoology (P. S. Chanturishvili), the Institute imeni Bogomolets (R. Ye. Kavetskiy) and also utilize, as far as possible, the chairs of medical institutes and of surgical clinics. The coordination of work on this problem has been entrusted to the Laboratory of Tumor Strains of the Institute of Experimental Pathology and Therapy of Cancer (Ye. Ye. Pogoyants).

As far as the investigation of harmful factors in the environment which may produce human cancer is concerned, work along these lines with the purpose of devising measures for the prophylaxis of cancer is being carried out at the Institute of Oncology of the Academy of Medical Sciences USSR (Laboratory of Experimental Oncology, L. M. Shabad), at the Institute of Experimental and Clinical Medicine of the Academy of Sciences Estonian SSR (P. A. Bogovskiy), at the Institute imeni Erisman, at the Institute of Communal Hygiene of the Academy of Medical Sciences USSR, and at the Institute of Nutrition of the Academy of Medical Sciences USSR.

It is planned to entrust to the Institute of Communal Hygiene, Academy of Medical Sciences USSR, the task of engaging 15 institutes working on the subject of dust contamination and bacteriological contamination of the air of cities in studies of the content of cancerogenic substances in the air. Prof L. M. Shabad, in cooperation with the Institute of Communal Hygiene and the Institute imeni Erisman has been charged with setting up unified methods for

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taking samples and determining the content of benzopyrene in these samples. It has been recognized as desirable that the role of cancerogenic substances borne by the air be investigated experimentally. Furthermore, a recommendation has been made to continue the investigation of the action of cancerogenic substances on the organism as influenced by the structure of these substances. This requires the participation in work on oncological problems of chemists who are active within the organization of the Academy of Sciences USSR, primarily as far as research done at the Institute of General Chemistry, Academy of Sciences USSR (Prof D. M. Mikhaylov) is concerned.

Investigations on the blastomogenic action of various types of radiation are being conducted at the Institute of Oncology, Academy of Medical Sciences USSR, in cooperation with the Sukhumi Medicobiological Station (N. N. Petrov, L. M. Shabad). The investigations in question have up to now been carried out to an entirely insufficient extent. It is proposed that the Institute of Biophysics, the Institute of Hematology, the Institute of Experimental Pathology and Therapy of Cancer, the Institute of Epidemiology and Microbiology imeni Gamaleya, and institutions which do work in radiobiology and radiopathology be asked to participate in work on this subject.

Investigations dealing with the role of nutrition in the genesis of tumors should be carried out at the Institute of Nutrition (Laboratory of Pathological Physiology, Prof L. L. Cherkes), the Institute of Biochemistry of the Academy of Medical Sciences USSR, and the Laboratory of Vitaminology. The coordination of this work has been entrusted to the Institute of Nutrition, Academy of Medical Sciences USSR.

Work on the role of the nervous system in the pathogenesis of tumors is being conducted at the Institute of Normal and Pathological Physiology, Academy of Medical Sciences USSR (Laboratory of Pathomorphology, Prof A. A. Solov'yev; and the Laboratory of Experimental Pathology, Prof S. I. Lebedinskaya), the Institute of Experimental Prophylaxis and Therapy of Cancer (Laboratory of Pathological Anatomy), the Institute imeni Gertsen (Laboratory of Pathophysiology), the Institute imeni Bogomolets in Kiev (Prof R. Ye. Kavetskiy), the Sukhumi Medicobiological Station, the Institute of Oncology of the Academy of Medical Sciences USSR at Leningrad together with the Institute of Physiology of the Academy of Sciences USSR, the Institute of Experimental Surgery of the Academy of Sciences of the Georgian SSR, the Kiev Roentgeno-Oncological Institute, and others. Prof A. A. Solov'yev, Corresponding Member of the Academy of Medical Sciences USSR, has been charged with the coordination of work in this field. The role of hormonal disturbances in the origin and development of tumors is being subjected to investigation at the Institute of Experimental Pathology and Therapy of Cancer (Laboratory of Hormones), the Khar'kov Institute of Endocrinology, and the Institute of Oncology of the Academy of Medical Sciences USSR. It has been pointed out that work on this subject should be expanded.

The conference called attention to the fact that problems of comparative oncology are not being subjected to systematic investigation. It is desirable to engage in work in this field the zoological, botanical, embryological, and veterinary institutions, primarily the Institute of Zoology of the Academy of Sciences USSR (Leningrad), the Institute of Zoology of the Academy of Sciences Georgian SSR, the Institute of Zoology of the Academy of Sciences Kazakh SSR (Laboratory of Wild Animals), the Botanical Institute of the Academy of Sciences USSR, and the Sukhumi Medicobiological Station. Relationships which govern normal and pathological (tumor) growth are being studied at the Institute of Experimental Biology, Academy of Medical Sciences USSR, and the Institute of Zoology, Academy of Sciences Georgian SSR. It would be desirable to induce the Institute of Morphology imeni Severtsev, Academy of Sciences USSR, to do work on this subject. As far as the biochemistry of malignant tumors is concerned, it has been

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noted that biochemical investigations in the field of oncology are being carried out at the biochemical laboratories of the Institute of Experimental Pathology and Therapy of Cancer of the Academy of Medical Sciences USSR, the Institute of Experimental Medicine of the Academy of Medical Sciences USSR at Leningrad, and the State Oncological Institute imeni Gertsen. Work which lies in this general field but is not a part of any planned project is also being carried out by individual biochemists at Kiev, Khar'kov, Rostov, Kalinin, and other cities. The work done by biochemists is closely connected with basic problems on which workers in the fields of etiopathogenesis, chemotherapy, and clinical medicine are conducting investigations. However, the importance of cooperation between different groups of investigators is being underestimated, with the result that insufficient contacts have been maintained hitherto.

Insufficient cooperation and coordination of work impede research in the fields of immunology and immunotherapy [of tumors], of virology [of tumors], hormonology and hormone therapy [of tumors], as well as that of malignization of explanted tissues under the effect of exogenic and endogenic factors. The same criticism can be applied to work in the fields of biochemistry and clinical medicine as applied to tumors. The small number of biochemists-oncologists and the inadequate equipment of laboratories, which does not correspond to the contemporary level of laboratory technique, often precludes the possibility of conducting many-sided investigations in cooperation with clinical oncologists, chemotherapeutists, etc.

As far as coordination of biochemical investigations is concerned, the conference has planned investigations in the following fields: (1) the specific characteristics of the biochemistry of protein and nucleoprotein metabolism of tumors and of the organism affected by tumors from the experimental and clinical points of view; (2) the mechanism of the action of typical representatives of different classes of chemotherapeutic agents including antibiotics, hormones, antimetabolites; and antivitamin from the experimental point of view and at the clinic; (3) characteristics of the metabolism of patients suffering from cancer who are being subjected to chemotherapy. To do work on these problems and on other individual problems, it has been planned to engage the cooperation of the Institute of Biochemistry and Medical Chemistry of the Academy of Medical Sciences USSR, the biochemical laboratories of the Institute of Experimental Medicine (Leningrad), the laboratories of the academies of sciences of union republics, and the chairs of biochemistry of higher medical educational institutions.

In the sectional meeting on the chemotherapy of malignant tumors it has been noted after the report given by Prof L. F. Larionov, Corresponding Member of the Academy of Medical Sciences USSR, that one of the most recent and most intensively developing fields of oncology, i.e., that of the chemotherapy of tumors, also necessarily requires the participation of specialists in various fields, i.e., chemists, pharmacologists, biochemists, clinical oncologists, and experimental technicians.

The principal lines of investigation carried on at present, as far as the synthesis of new anticancer substances and attempts at their isolation are concerned, utilize the following groups of substances: (1) compounds which have an alkylating action, i.e., chloroethylamines, derivatives of ethyleneamine, phosphoric acid amides etc.; (2) antimetabolites, i.e., antivitamin substances, derivatives of purines and pyrimidines, and indispensable amino acids and their peptides; (3) miscellaneous compounds such as epoxides, methanesulphonic acids, etc.; (4) substances containing radioactive isotopes; (5) synthetic hormones, particularly androgens which have a minimum virilizing effect as well as substances which suppress the functioning of various endocrine glands; (6) naturally occurring substances, mainly products of the

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vital activity of actinomycetes and fungi; and (7) chemical agents of vegetable and animal origin in their natural or refined state, including popular medicines.

One must provide for prompt pharmacological testing of antitumor drugs that have been found active in animal experiments, because clinical tests can be carried out much sooner if this is done. The cooperation of the chairs of pharmacology, of medical higher educational institutions, and of the Institute of Pharmacology, Academy of Medical Sciences USSR, must be secured to expedite this work.

At the sectional meeting on the regional pathology of malignant tumors (conducted by Prof. A. I. Serebrov, Corresponding Member of the Academy of Medical Sciences USSR and A. V. Chaklin, Candidate of Medical Sciences) it was pointed out that the investigation of regional peculiarities in the incidence of malignant tumors represents a new field of investigation in oncology, and that data obtained in research along these lines may contribute to a better knowledge of the origin of malignant tumors.

At present, work on the regional pathology of malignant tumors is being conducted at the Institute of Oncology, Academy of Medical Sciences USSR. This line of investigation may make it possible to collect important data pertaining to the virology of malignant tumors and may, therefore, contribute to a rapid solution of a number of practical problems in oncology. The cooperation of oncological institutions of the various republics and oblasts should be engaged in this important work. One must investigate the special characteristics of the incidence in some rayons and oblasts of the USSR of malignant tumors of the skin, lower lip, esophagus, oral cavity, lactic glands, and uterus in connection with the occupation and other conditions of life, the sex, age, customs, environmental factors, etc.

To assure that these investigations are accurate from the scientific point of view, it is absolutely necessary to carry out a statistical count of malignant tumors with obligatory computation of the most prominent indexes and investigations of data on visits made to oncological institutions, the incidence of malignant tumors, results of prophylactical medical inspections of the population carried out on a mass scale (in the sense that the frequency of the occurrence of the individual forms of malignant tumors must be evaluated, and finally on the nature and morphology [literally "structure"] of malignant tumors affecting the group of patients who die of these tumors.

The data mentioned above, which are available at oncological institutions in absolute figures covering all years subsequent to World War II, may be of scientific interest only if clearly defined indexes are determined on their basis. The coordination of investigations in the field of regional pathology in 14 union republics has been entrusted to the Institute of Oncology of the Academy of Medical Sciences USSR, in the Ukrainian SSR to the Ukrainian Rentgeno-Oncological Institute, and in the RSFSR to the State Oncological Institute imeni Gertsen.

Work in the field of regional pathology should be carried out in cooperation with representatives of the following specialties: (1) ethnographers (Institute of Ethnography and Anthropology imeni Miklukha-Maklay, Academy of Sciences USSR); (2) persons active in the organization of public health and statistics (the Institute of the Organization of Public Health and of History of Medicine imeni M. A. Semashko, Academy of Medical Sciences USSR); (3) geologists, so that the frequency of tumors may be correlated with the content of useful fossils and minerals in various regions, with particular consideration of the presence of radioactive useful minerals; (4) hygienists (Institute of Communal Hygiene, Academy of Medical Sciences USSR), for the purpose of

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evaluating the incidence of such forms of cancer as cancer of the lungs in order that a connection may be established between the frequency of certain forms of cancer, such as cancer of the lungs and skin, and the degree of contamination of the atmosphere in various industrial regions of the country; (5) dieticians (Institute of Nutrition, Academy of Medical Sciences USSR), for the purpose of investigating the correlation between individual forms of malignant tumors, such as tumors of the gastrointestinal tracts, and the type of nutrition in various localities, as well as for an evaluation of the incidence of cancer of the gastrointestinal tract in dependence on the content of vitamins in the foodstuffs that are consumed; (6) workers in the field of sanitary education (Institute of Sanitary Education, Ministry of Health USSR), so that many-sided work may be carried out, with consideration of regional conditions, on the organization of anticancer propaganda aiming at the elimination of those conditions which may contribute to an increased incidence of some forms of malignant tumors.

With the purpose of coordinating and unifying the methods used in the study of regional characteristics and also with the view that a definition of the subjects recommended for investigation be available, the conference has charged the Institute of Oncology, Academy of Medical Sciences USSR, with the compilation of a letter in which the basic tasks in this field will be outlined and methods for carrying out the work indicated.

The Scientific Council on Problems of Oncology at the Presidium of the Academy of Medical Sciences USSR will undertake general direction of work on regional pathology of malignant tumors.

A detailed resolution has been passed by the conference. The next meeting on the coordination of work in the field of oncology has been planned for 1956 and will be held jointly with institutions of the Ministry of Higher Education USSR.

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